

## KIWA MW LOOP ANTENNA

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KIWA Electronics, of Yakima WA has recently made available its first MW loop antenna.

Over a year of research and experimentation went into both the physical and electronic design. It employs smooth Teflon bearings for rotation and tilt, as well as a geared tilt mechanism with little or no backlash. The pre-amplifier includes adjustable regenerative feedback for increased selectivity.

The loop stands 16 1/2 inches high and is mounted on a sturdy wood base (you need tooth ache the loop to the base after unpacking). Workmanship is excellent, the overall black finish makes it look quite sharp (great for those into aesthetic DX equipment). The lettering and graphics give nostalgic hints of equipment from yesteryear. Fully assembled, the weight is approx 14 pounds. A compass is mounted to the center top of the loop. An 8 foot/5 conductor cable leads from the loop to the control box, where the tuning, gain and regeneration controls are located. Two separate 50 ohm outputs (PL-259connectors) allow the user to use the loop with two different receivers at the same time.

**DETAILS.** The loop is wound on a 12 3/4 inch, 1/4 inch thick PVC pipe with magnet wire. The loop is horizontally mounted inside a 1/2 inch thick PVC pipe which connects to the base (it can also be used to carry the loop). Two small plastic boxes are mounted inside the loop, the bottom one houses the tuning, pre-amp and regeneration circuit. Matched LS5912 / H11F3 FETs are used in the amplifier/regeneration design. The top box acts as a counter balance to the electronics box. The 5 conductor cable exits the electronics box and passes through the left mount to the control box. On the outside of the right mount is the geared tilt box (3:1 gear reduction - very nice). One knob for tilt adjustment, the other indicates the tilt angle.

The loop consists of 4 separate windings and tunes 530-1720 kHz. The two 2-turn outside windings are for the regeneration circuits. The two 11-turn windings are for the two main tuned circuits, tuned with varactor diodes (inside the electronics box). The windings are wound in grooves mechanically cut into the loop PVC pipe. This guarantees exact symmetry of the coil and the nulls (see below). The ends of the windings pass through the bottom of the loop and into the electronics box. A local/DX switch is mounted on the electronics box, which allows the user to select negative/positive feedback from the two regeneration loops (specified as a 25 dB reduction in pre-amp gain). Negative feedback drops the gain as well as flattens out the frequency response of the loop for 'hi-fi' listening. Positive feedback (or regeneration) narrows the frequency response and adds gain at the tuned frequency. The amount of feedback is adjustable.

The control box can be conveniently placed near the receiver which allows easy adjustments to be made without interfering with the loop itself. The gain knob allows adjustments from 'off' to 'wide open' and adjusts the gain to both receiver outputs at the same time. This feature allows the user to tailor the loop output for a wide variety of receiving equipment (from a simple portable to communications receivers) without the possibility of overload. Loop tuning is accomplished with two knobs, coarse and fine tuning. The coarse knob is adequate for the lower AM band (to 900 or so), but the fine tuning knob becomes necessary when the upper band is tuned (it can also be used to easily adjust the loop peak to either side of the frequency of interest). The final knob is used for regeneration adjustment, which regulates how much of the regeneration loop signal is fed back into the main pre-amp. There is enough range on this knob to adjust from no feedback to well past oscillation in all situations. Power for the antenna is connected to the control box as well, either from the AC adapter (included) or from 13.7VDC (typical car battery or other DC supply - I did not try this). Current draw is specified as 50 mA (I didn't measure this).

**USING THE LOOP.** The KIWA loop operates much the same as other loops I've tried. After tuning the receiver, the loop is tuned. The loop is then rotated and/or tilted for optimum performance. I rotate mine by grasping the outer 1/2 inch PVC, and have found the adjustment to be smooth. To tilt the loop (usually only necessary for nulling), grasp the lower knob on the tilt box and adjust to the appropriate angle keeping an eye on your S-meter/LEDs for minimum signal. Trading off between adjusting the rotation and tilt is necessary for optimum null. The null is very sharp and, with patience, is very deep. Using a R-70, with an un-calibrated S-meter, my locals were nulled from 30-50 dB, most of them to the point of receiving audio from stations underneath. The null will not seem as 'deep' if there is no station to

receive... but the S-meter will tell you it's significant (often times you'll hear a rush effect in the null if there is not another station to receive). There is little to no effect caused by hand capacitance, when you move you hand away from the loop, the null remains!

I have made several measurements of the symmetry of the nulls on various local stations and have found them to all be 180 degrees apart. My procedure is as follows: first the station is nulled, the top compass pointer is adjusted to the null and the tilt angle is scribbled down somewhere. Then the loop is swung 180 around and the null is once again established (depth is approx the same either direction). Checking the compass reveals the pointer 180 degrees from it's adjustment and the tilt angle to be the same... very good. The compass can therefore be used as an effective direction finder (often useful in distinguishing signals of TP origin versus DU signals on the same frequency).

The regeneration really shines when trying to dig out stations located next to locals. As usual, the local tuned and nulled, then the receiver and loop are tuned to the desired adjacent frequency (no need to touch the loop - a great asset). The regeneration control is then adjusted (clockwise). As the oscillation point is neared, the sidebands of the received signal begin to drop off (you can easily notice this by the loss of high frequency 'hiss' in the received signal). Back off slightly from the oscillation point. Too little back off may result in some 'bleed through' from the local, too much and the sidebands return, practice makes both of these situations easy to recognize. The fine tuning knob must also be adjusted, as the frequency seems to change a bit near oscillation. As long as you know that you need to adjust both the regeneration and fine tuning knobs, this does not present a significant problem. Adjust both knobs for optimum signal. You can then tune farther away from the local, like you would with a narrow filter, and re-peak, thus tuning into the side-band farthest away from the local. Regeneration can also cut some of the 'hiss' in more normal DX situations. What the KIWA loop provides, then, is an additional element in your set-up for achieving better selectivity in tight DX situations.

I have found that for about a half hour after power up, the loop tuned frequency drifts a bit. This may be due to a warm-up of the circuits generating tuning voltages. When using the regeneration (or upper band DX), the drift is significant enough to tune the loop away from the peak... a slight adjustment is necessary to re-peak... so be sure to check your tuning once in a while. I am getting into the habit of turning on the loop at least a half hour before I leave it on for the night... then doing a final 'fine tuning' adjustment before leaving. No significant drifting is noted the next morning using this technique.

KIWA electronics provides a manual with the antenna. All the specifications are outlined, as well as a complete discussion of optimum set-up location. Each of the controls is described, as well as an easy to understand dialog of how to use the loop for nulling. There is also a brief discussion on bearing measurements. In addition, alignment instructions are provided, as well as some tips for antenna maintenance (including replacing the O ring in the 'tilt' gear box). A complete set of schematics for both the electronics and control box are provided. Directions for obtaining customer service are included. The KIWA loop comes with a 1 year Warranty, plus a 30 day trial period, and is available from KIWA Electronics, 612 S 14th Ave, Yakima WA 98902 for \$340plus shipping.